# FRD01 – On Farm Research and Demonstration 3 Evaluation of Cover Crop Mixture for Nitrogen Production, Nutrient Cycling and Mitigating Compaction

**State Criteria for on Farm Research and Demonstration**

**Research Topic:** Evaluation of cover crop mixture for nitrogen production, nutrient cycling and mitigating compaction.

**Contact information:** Charles Wortmann, 369 Keim, 4024722909, cwortmann2@unl.edu with support from Extension Educators Paul Hay, Jim Schneider, Keith Glewen, Mark Hinze, and David Varner.

**Name and brief description of the research entity:** The University of Nebraska-Lincoln Extension.

**General description and summary of research to be conducted:** Cover crops have been used in years prior to commercial fertilization and in organic programs to produce nitrogen, add organic matter and recycle nutrients. No-till producers wanting to add diversity to their systems, use excess moisture, and realize the previously mentioned benefits are fitting cover crops into their programs. Quantifying the nutritional benefits, i.e. how much nitrogen to credit for the crop following a cover crop with a leguminous component, is important to realize the full benefit and to not over fertilize. The UNL N recommendation has been well validated for maximizing profitability at high (e.g. >240 bu/ac) as well as lower yield production over diverse production situations under standard corn production programs, but not with the use of cover crops. Without understanding the full N credit that is due from the cover crop, the producer is likely to apply excessive N in relation to crop needs resulting in reduced profitability and more N loss to the environment.
**Objective**: Measure yield response for the subsequent N using crop planted on cover crop vs. the crop planted without use of a cover crop as well as evaluating response within the cover crop/non cover crop treatments when varying N application utilizing the UNL± 30 lb N rates.
**Procedure**: Conduct trials with 6 treatments: Cover crop and non cover crop with 5 replications, each being 120’ in width. Within those treatments - UNL, UNL-30; UNL+30 N applications each 40’ in width. The cover crop vs. non cover crop treatments will be long strips across the field. Most likely, the N treatments would also be in field length strips, however if using variable rate technology, the N treatments can be segmented to have 2 plots per field length, but minimum length should be 900 ft. This would provide for increased replication of the N treatments within the cover crop/non cover crop treatments. This trial does not require a guidance system or yield mapping but these are preferred.

**Area of Focus:** Soil quality.

**Geographic Area:** Annual crop producers in corn-soybean based systems in the counties of Lancaster, Gage, Jefferson, Hamilton, Saunders, Stanton, Hall, Adams and Dodge counties.

**Participant requirements:**

- A detailed plan must be developed in conjunction with the researcher that provides project details, plot locations, on aerial photos and in written format and **be provided to NRCS prior to scheduling the project.**
- All inputs for the research project, including cover crop seed, fertilizer, herbicides, farm equipment, and manpower will be provided by the participant. Participating producers will be responsible for contacting an Extension Educator for technical assistance at critical times (layout of trial, applying treatments, harvest), all field operations including those for establishing the trial and collecting the yield data; in some cases the technical assistance may be delegated by the Extension Educator to a crop consultant or another agronomic advisor.
- Grain yield for each strip will be collected using a weigh wagon, yield map or monitoring equipment, or other means in agreement with the cooperating Extension Educator. Grain moisture will be determined for each strip. All data will be provided to the cooperating Extension Educator. All costs of implementation, excluding Extension advisory visits, will be the responsibility of the producer. Hybrids/varieties and other management practices will be the producer's choice.
- Minimum of 25 acres will be needed for the replications. Growers must have their own harvest equipment, preferably equipped with a yield monitor. Growers with their own sprayers and fertilizer applicators are preferred, but commercial herbicide and fertilizer applications are acceptable.
- The research will last a minimum of three years.

**Number and size of on-farm research sites needed:** At least 3 growers from the geographic area. Each site must be at least 25 acres.

**Documentation: Complete the following Table and provide the documentation listed below:**

| Tract | Field(s) | Acres Planned | | | | Acres Applied (completed by operator) |
|---|---|---|---|---|---|---|
| *EX. 1* | *1* | *20* | | | | *20 acres* |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

**I certify that the following information meets specifications and has been provided to NRCS:**

1. Complete the table above and provide a map with delineation of the area where the enhancement was applied including partial fields.
2. Photographs of a representative number of fields/plots showing demonstration or research.
3. Final report based on University of Nebraska Extension Service that documents that details findings of the research project including soil moisture, inputs, yields, plot records, replicated treatments and all other pertinent information on each plot.

**Certified by:** _____ **Date:**_____